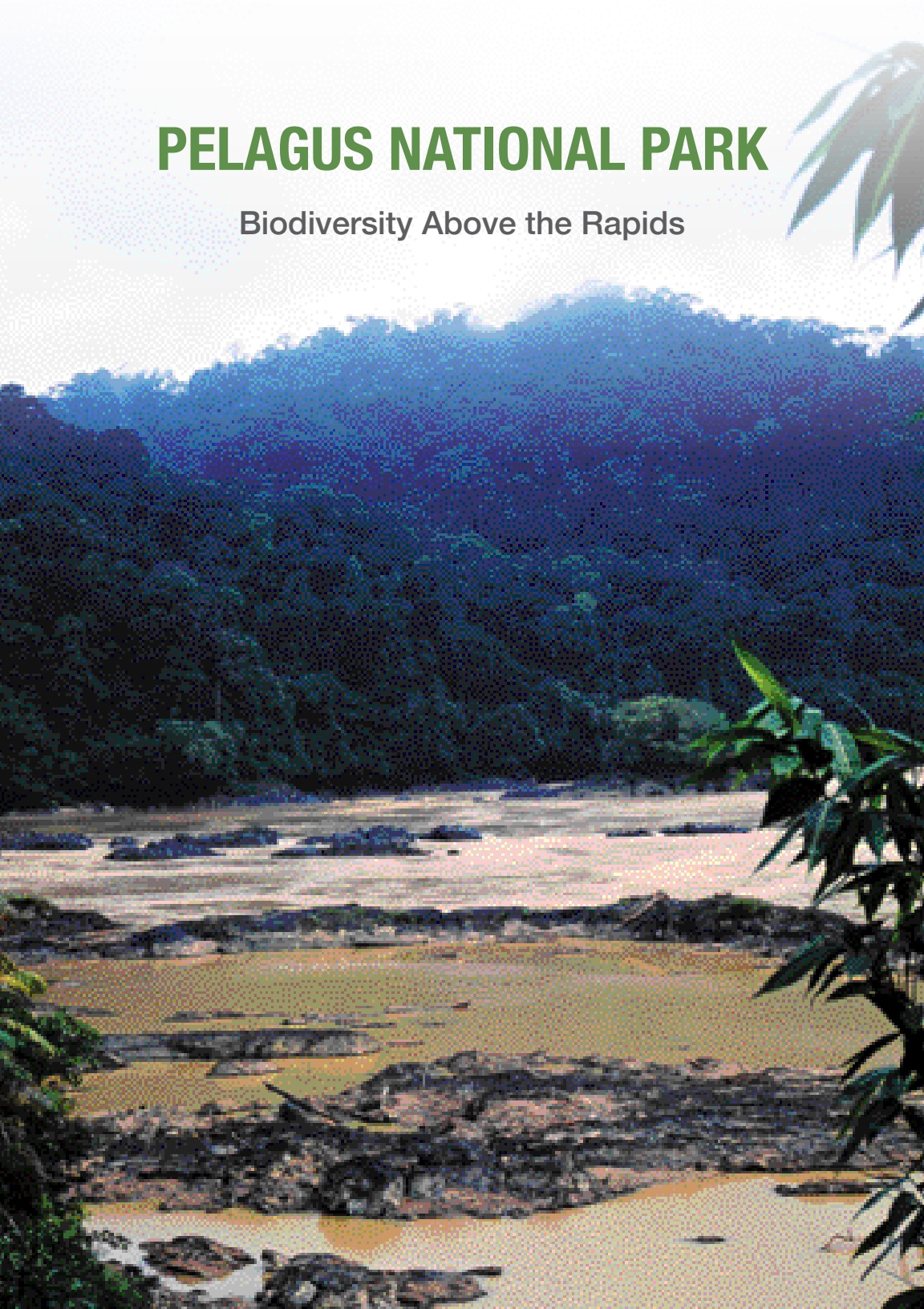
PELAGUS NATIONAL PARK

Biodiversity Above the Rapids



Life from Headwaters to the Coast

PELAGUS NATIONAL PARK

Biodiversity Above the Rapids

Edited by

Andrew Alek Tuen, Indraneil Das
Karen Lee Suan Ping and Jayasilan Mohd-Azlan

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Frontispiece: *Megophrys nasuta*, the Bornean Horned Frog. Photo: Pui Yong Min
Foreword page and across: Aerial view of Pelagus Kaki Wong. Photo: Tonny Ganyai.

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FOREWORD

Prof. Datuk Dr. Mohamad Kadim Suaidi
Vice Chancellor, Universiti Malaysia Sarawak

Since its humble beginnings in 1992, Sarawak's first public university, Universiti Malaysia Sarawak (UNIMAS), has put natural resource management and biodiversity conservation at the forefront of its research agenda. This includes the setting up of the Faculty of Resource Science and Technology and the Institute of Biodiversity and Environmental Conservation. The location of UNIMAS on the island of Borneo has given us a unique opportunity to study its biodiversity, one of the most diverse in the world. Over the years, university researchers have discovered new species and uncovered new facets of the biology of numerous threatened species and landscapes, contributing to the conservation of species and habitats in Sarawak and beyond.

To be globally relevant and forward looking, UNIMAS has established linkages and collaborated with like-minded individuals and institutions within Malaysia and overseas. On 24 September 2013, we formalised a research collaboration with Sarawak Energy, to embark on the first in-depth study of the 2,041-hectare Pelagus National Park. As a result of this collaboration, significant new findings have come to light and have been featured in this book.

I would like to congratulate the authors, editors and publishers for their hard work and perseverance, to help unravel the wonders of biodiversity of Pelagus, and make this place of magic and mystery accessible to the world.

MESSAGE

Datu Haji Sharbini Suhaili
Group Chief Executive Officer, Sarawak Energy Berhad

Congratulations to all those who are part of this important publication. Your contribution will enhance knowledge and understanding of Sarawak's biodiversity areas in general and the Pelagus National Park in particular.

In mid-2020, it was announced by the Sarawak government that Sarawak will become a high-income economy by 2030 through the two core principles of a digital economy and environmental sustainability, and Sarawak Energy is fully aligned to this vision.

We are developing our energy resources sustainably to deliver greater access to affordable, reliable and sustainable energy for Sarawak and its people, in alignment with Goal #7 of the United Nations Sustainable Development Goals (SDG) 2030.

Just over a decade ago, Sarawak made a strategic decision to reduce our dependence on thermal resources of coal, gas and diesel through the Sarawak Corridor of Renewable Energy.

As a result, Sarawak Energy is now the largest renewable energy developer and provider in Malaysia through our investments in large renewable hydropower as well as solar and micro-hydro for remote areas.

As a member of the International Hydropower Association, we are a strong advocate of sustainable hydropower and are working to integrate a robust sustainability agenda into our business. It is estimated that less than 2% of our land area will be affected when we fully harness our hydropower potential to ensure a sustainable energy future for our state and beyond.

To conserve biodiversity in line with SDG #15, we are working with various state agencies, higher learning institutions, local communities and stakeholder groups on efforts to mitigate any negative impact and maximise the positive impact of our projects and operations.

Initiatives include the implementation of sustainable management of forest types which are important water catchments. We also contribute to

the conservation, restoration and sustainable use of terrestrial and inland freshwater ecosystems and their services. Our partnerships so far have yielded encouraging successes.

1. The Batang Ai National Park and catchment area, located within the area of the 35-year-old Batang Ai Hydroelectric Plant (HEP), serve as a buffer zone that supports the regeneration of the surrounding environment. The area is now home to a sustainable population of the Bornean orangutan in Sarawak and forms part of the transboundary conservation area with Indonesia's Betung Kerihun National Park.
2. For the Murum HEP project, the Wildlife Monitoring and Rescue (WiMoR) operation with the Sarawak Forestry Corporation rescued and relocated wildlife in significant numbers to safer areas before impoundment.

To ensure we understand the effectiveness of our efforts, research and development is an important part of our business. This creates greater understanding of the impact of our projects by enhancing the body of knowledge and enables us to make informed decisions in environmental management and conservation.

In 2013, we partnered with Universiti Malaysia Sarawak (UNIMAS) and rolled out the Hydropower Environmental Sustainability Programme with a focus on three objectives:

i. To identify critical local environmental issues that warrant closer attention;
ii. Collect necessary data in forming baseline knowledge particularly in the areas of aquatic and terrestrial ecology and biodiversity; and
iii. Support the development of local research capability and capacity within Sarawak on related environmental topics.

The 2,041-hectare Pelagus National Park was identified as one of the study locations under this programme given its importance as a protected area. Significant findings have been established and are featured in this book.

We are pleased to support this book publication together with Universiti Malaysia Sarawak (UNIMAS) in line with SDG #17 which calls for multi-stakeholder partnerships that mobilise shared knowledge, expertise, technology and financial resources.

On behalf of Sarawak Energy, I would like to thank UNIMAS for this research collaboration and for sharing your expertise and resources.

We are also fortunate to have collaborated with and gauged the support from like-minded organisations such as our higher learning institutions, Forest Department Sarawak and Sarawak Forestry Corporation in enabling Sarawak Energy to play a greater role in local environmental conservation efforts.

I would also like to congratulate Sarawak Energy's Research and Development team. I am confident that you have gained valuable experience and further exposure through this research as part of Sarawak Energy's hydropower development journey.

PREFACE

Andrew Alek Tuen, Indraneil Das,
Karen Lee Suan Ping* and *Jayasilan Mohd-Azlan

Sarawak's vast protected areas network, including its National Parks, are home to many of the State's natural wonders- floral, faunal, geological and at the level of landscapes. Central Sarawak, in particular, is an important area for biodiversity conservation, being home to uncountable Bornean endemics.

Its thriving National Parks vindicate the commitment of the State Government as a responsible caretaker of Sarawak's biodiversity. Halting biodiversity loss is one of the top State agendas, whereby Sarawak is determined to conserve and protect its wildlife and natural ecosystem. This project sits in line with the University's niche area of biodiversity and environmental conservation. This book, based on extensive field research by the staff of our two organisations, brings together new information on species, their habitats and other aspects of natural history.

Little has been written about Pelagus National Park. Scientific understanding of biodiversity intended for conservation is crucial for our advancement to preserve the State's natural heritage. Identifying the distribution, richness and habitat use of animals in tropical rainforest are essential for understanding their ecology, and in facilitating management of such biodiversity-rich areas. This book attempts to enumerate selected zoological groups, many of which had hitherto remained undetected in these dense tropical rainforests. The faunal studies reported here include inventories of mammals, birds, reptiles, amphibians, fishes and macroinvertebrates, a critical first step towards understanding the biodiversity of Pelagus National Park.

The work targets local stakeholders, management authorities, naturalists, researchers and the general public. Most enthusiasts continue to see protected areas as a parade of natural wonders, to be appreciated and protected for future generations. An understanding of our biodiversity may thus support complex needs of conservation. It is hoped that nature enthusiasts and those who are interested in tropical biodiversity will find this book beneficial. Acknowledgement is here made to the authors who have gathered these data, substantially increasing our knowledge and awareness of an important part of our national heritage.

Foremost, we thank Sarawak Energy Hydropower Environmental Sustainability Program for a research grant to conduct the activities mentioned in this work. We are grateful to the Resident of Kapit Division for welcoming us to the area under his jurisdiction, and to the longhouse folks from Rumah John at Nanga Benin (John anak Asun and family), Rumah Bujah at Nanga Pelagus (Bujah anak Ijau and family) and Rumah Laja at Nanga Peraran (Laja anak Sandak and family), for assisting with the research.

Prof. Dr. Wan Hashim bin Wan Ibrahim, the Deputy Vice Chancellor for Research and Innovation, Prof. Dr. Lo May Chiun and her staff at the Research Innovation and Enterprise Centre facilitated the research on the UNIMAS side. We also thank the staff of the Institute of Biodiversity and Environmental Conservation, and the Faculty of Resource Science and Technology, UNIMAS, for logistic and field assistance: Isa Sait, Rahah Mohd. Yakup, Mohd. Hasri Al-Hafiz Haba, Ketty Daun, Pasey Lisus, Mohsin bin Zainalabidin, Siti Maimunah binti Ibrahim and Felicia Reyap, besides our many research assistants and graduate research students.

The Sarawak Forest Department provided research permits for the individual projects reported here. Entry to Pelagus Resort area was provided by Pelita Holdings Sdn. Bhd, and we thank its manager, Netty Haji Narawi. We thank Mohd. Tajuddin Abdullah, Qammil Muzzammil Abdullah, Amirruddin Ahmed, Faisal Ali Anwar Ali, Aaron M. Bauer, Henry Bernard, Chan Kin Onn, Stuart James Davies, Ulmar Grafe, Suhaila binti Abdul Hamid, Kelvin Lim, Lo May Chiun, Suhaili Mokhtar, Mustafa Abdul Rahman, Abdullah Samat and Tan Heok Hui for reviews of the chapters, and Genevieve V. A. Gee for copy editing. We are thankful to Chien C. Lee for images of birds, Faisal Ali Anwar Ali for the images of bats and to the family of the late Brian Houldershaw for the images of the Rapids from the 1960s, made possible through the kindness of Albert Field.

We dedicate this book to the kind-hearted folks of the Rajang Basin, who offered us their homes and carried the burden and joy of discovery.

TERRESTRIAL MAMMALS

Jayasilan Mohd-Azlan, Melynda Cheok Ka Yi, Thaqifah Syaza Jailan, Nurul Asna Hidayah Mior Abdul Rahman* and *Andrew Alek Tuen

Information on the distribution and habitat needs is critical in formulating conservation recommendations. Lack of information on microhabitat requirements for many Bornean species impedes conservation action, especially for species of conservation importance. This study focused on the distribution and activity patterns of terrestrial mammals in the interior of Sarawak. The terrestrial mammals of Borneo include 288 species, of which 102 and 61 species are dominated by bats and rodents, respectively. Large and mid-sized mammals are generally thought to be charismatic and provide economic opportunities or are of conservation concern, although some are considered as nuisance. Mammals respond differently to habitat alterations, with some being more sensitive than others. Since they form important

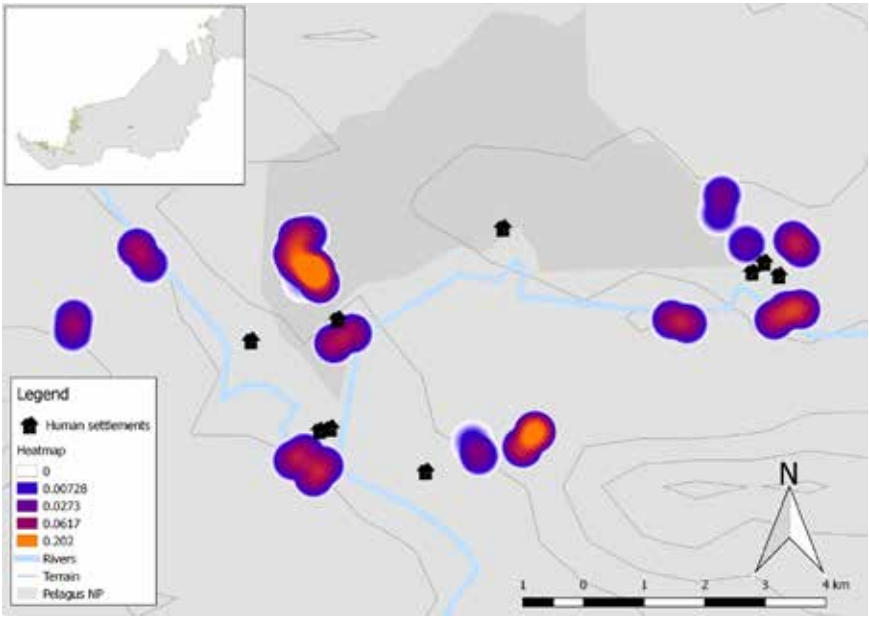

Fig. 1. Heat map showing mammal species richness within and outside Pelagus National Park, Sarawak. Areas with darker shade indicate more species detection compared to surrounding areas.

Fig. 2. (a) Marbled Cat; (b) Bay Cat; (c) Banded Palm Civet; (d) Pig-Tailed Macaque; (e) Bornean Red Munjac; (f) Malay Weasel; (g) Bearded Pig; (h) Malay Civet.

components of terrestrial ecosystems, the group can be affected by hunting, and/or loss and alteration of habitats.

A comprehensive camera trapping survey was conducted in the Pelagus area. The study area is located along the Rajang River, which is approximately a two-hour express boat ride from Kapit town. Iban longhouses dominate the area, and the sole mode of transportation is via the river. The Pelagus National Park (centred around the erstwhile Pelagus Regency Resort) covers remnant lowland forests with an expanse of secondary forests, especially in the vicinity of tribal longhouses. Some hunting activity and collection of natural resources, such as rattan, medicinal plants and timber, have been recorded here. The Park is dominated by mixed dipterocap forests, with some areas last logged in the 1960s. Dominant vegetation includes important fruiting and economically important timber trees (e.g., *Baccaurea* sp., *Artocarpus* sp., *Koompassia malaccencis*, *Koompassia excelsea*, *Shorea* sp., *Syzygium* sp., *Xanthophyllum* sp., *Ficus* sp.). On the other hand, the forests surrounding the longhouses are mostly planted with crops up to one kilometre radius. Agricultural activities in the area include rice cultivation, and planting of vegetable (e.g., *Sauropus androgynous*) and fruit bearing trees (e.g., *Artocarpus* spp. *Durio* spp., *Canarium odontophyllum*).

We used Camera Traps (Bushnell® Trophy Cam), and marked them with GPS (Garmin GPSMAP® 64s). Base camps were set up in the villages nearest to the field sites, and local field assistants were hired as guides in the deployment of camera traps.

This study was focused on mid-sized to large mammals (body over a kilo as adults). A total of 34 camera traps were deployed over a sampling period of 11 months throughout 2014 and 2015, yielding 6,782 independent photographs from 5,501 camera trap days. Independent events are defined as consecutive photographs of different species and consecutive photographs of individuals of the same species taken one hour apart. Of the 46 identifiable species, 30 are mammals which mainly consist of 17 species from the order Carnivora. Three out of the five known species of Bornean wildcats were photographed during the survey, including the 1998 Sarawak Wild Life Protection Ordinance's Totally Protected *Catopuma badia*, *Pardofelis marmorata*, and the Protected *Prionailurus bengalensis*. Species richness in Pelagus (30 species, 5501 days, 45 sites) is higher than in other protected areas (such as Maludam National Park, 11 species; Loagan Bunut National Park, 10 species; Lambir Hills National Park, 13 species; Kubah National Park; Lanjak Entimau Wildlife Sanctuary, 21 species) and non-protected areas (i.e., mixed-used planted forest, 25 species; planted forest zone, 27 species). However, we do note that sampling effort, habitat type and camera traps used

in these studies are not always comparable, and have the potential to influence the number of detections.

Of the 30 mammalian species identified, 28 were detected within and outside the Pelagus National Park. The elusive Bay Cat (*Catopuma badia*) and Banded Linsang (*Prionodon linsang*) were found exclusively in the National Park area, while otters and the Malay Weasel (*Mustela nudipes*) were only detected outside of the Park. At least 13 species of conservation importance within this group of mammals were recorded within the Park are in the IUCN Red List, while 12 other species were recorded outside the Park (Table 1). This suggests that neighbouring pristine habitats near Pelagus National Park may harbour species of conservation importance. Such species-rich unprotected areas need to be brought into the protected areas system.

A Checklist of Terrestrial Mammals

Summary of mammals recorded via camera traps from Pelagus from May 2014 to April 2015. IUCN: International Union for Conservation of Nature; CR: Critically Endangered; EN: Endangered; NT: Near Threatened; VU: Vulnerable; LC: Least Concern; SWLPO: Sarawak Wild Life Protection Ordinance 1998; TP: Totally Protected species; P: Protected species; CITES: Convention on International Trade in Endangered Species of Wild Fauna and Flora; I: Appendix I; II: Appendix II; III: Appendix III (India); NL: Not Listed.

Order	Family	Species	Common name	IUCN	SWLPO	CITES (Appendix)
Carnivora	Felidae	*Catopuma badia* (Gray, 1874)	Bay Cat	EN	TP	II
		Pardofelis marmorata (Martin, 1837)	Marbled Cat	NT	TP	I
		Prionailurus bengalensis (Kerr, 1792)	Leopard Cat	LC	P	II
	Ursidae	*Helarctos malayanus* (Raffles, 1821)	Sun Bear	VU	P	I
	Viverridae	*Arctictis binturong* (Raffles, 1821)	Binturong/ Bearcat	VU	P	III (India)
		Arctogalidia trivirgata (Gray, 1832)	Small-toothed Palm Civet	LC	P	NL
		Hemigalus derbyanus (Gray, 1837)	Banded Palm Civet	NT	P	II
		Paguma larvata (C.E.H. Smith, 1827)	Masked Palm Civet	LC	P	III (India)
		Paradoxurus hermaphroditus (Pallas, 1777)	Common Palm Civet	LC	P	III (India)
		Viverra tangalunga (Gray, 1832)	Malay Civet/ Tangalung	LC	P	NL
	Herpestidae	*Herpestes brachyurus* (Gray, 1837)	Short-tailed Mongoose	NT	P	NL
		Herpestes semitorquatus (Gray, 1846)	Collared Mongoose	NT	P	NL
	Mustelidae	*Martes flavigula* (Boddaert, 1785)	Yellow-throated Marten	LC	NL	III (India)
		Mustela nudipes (Desmarest, 1822)	Malay Weasel	LC	NL	NL
		Aonyx or *Lutra* sp.	Otter	EN/VU/NT	P	II

Order	Family	Species	Common name	IUCN	SWLPO	CITES (Appendix)
	Prionodontidae	*Prionodon linsang* (Hardwicke, 1821)	Banded Linsang	LC	NL	II
	Canidae	*Canis familiaris* Linnaeus, 1758	Common Dog			
Artiodactyla	Tragulidae	*Tragulus kanchil* (Raffles, 1821)	Lesser Mouse-deer	LC	NL	NL
		Tragulus napu (F. Cuvier, 1822)	Greater Mouse-deer	LC	NL	NL
	Cervidae	*Muntiacus atherodes* (Groves & Grubb, 1982)	Bornean Yellow Muntjac	NT	NL	NL
		Muntiacus muntjak (Zimmermann, 1780)	Common Barking Deer	LC	NL	NL
		Rusa unicolor (Kerr, 1792)	Sambar Deer	VU	NL	NL
	Suidae	*Sus barbatus* (Müller, 1838)	Bearded Pig	VU	NL	NL
Rodentia	Hystricidae	*Hystrix brachyura* (Linnaeus, 1758)	Common Porcupine	LC	P	NL
		Hystrix crassispinis (Günther, 1877)	Thick-spined Porcupine	LC	P	NL
		Trichys fasciculata (Shaw, 1801)	Long-tailed Porcupine	LC	P	NL
	Sciuridae	*Rheithrosciurus macrotis* (Gray, 1856)	Tufted Ground Squirrel	VU	TP	NL
Primates	Cercopithecidae	*Macaca fascicularis* (Raffles, 1821)	Long-tailed Macaque	LC	P	II
		Macaca nemestrina (Linnaeus, 1766)	Pig-tailed Macaque	VU	P	II
Pholidota	Manidae	*Manis javanica* (Desmarest, 1822)	Sunda Pangolin	CR	P	I